



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/IB97/01031 (22) International Filing Date: 25 August 1997 (25.08.97) (71) Applicant (for all designated States except US): EL-MOSLIMANY, Samia [US/SA]; P.O. Box 15133, Jeddah 21444 (SA). (71)(72) Applicants and Inventors: THABIT, Khalid, Omar [SA/SA]; P.O. Box 231, Jeddah 21411 (SA); AL-DEHLAWI, Fouad, Mohammed-Amin [SA/SA]; P.O. Box 15133, Jeddah 21444 (SA).</p>		<p>(81) Designated States: AL, AM, AT, AU (Petty patent), AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DE (Utility model), DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report.</i> <i>With amended claims and statement.</i></p>
<p>(54) Title: INTELLIGENT FILING SYSTEM</p> <div data-bbox="284 756 766 1065"> </div> <p>(57) Abstract</p> <p>The invention is about an Intelligent Filing System that locates the wanted file in an unordered archive. This is achieved by a wireless receiver placed on each file. The receiver has Light Emitting Diode (LED) or small speaker which is activated when the request is transmitted by a transmitter via Radio Frequency (RF) or Infra Red (IR). The LED's flash (or the speaker starts beeping) and a number would appear on the receivers Liquid Crystal Display (LCD) panel. The received number indicates number of the department requesting that file. Upon the receipt of the signal, the receiver has the option to send a confirmation message to the transmitter confirming the receipt of the message. This idea may also be implemented in the warehouses for spare parts, for books in the library or on any large number of distinct items that need to be retrieved.</p>		

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INTELLIGENT FILING SYSTEM

Technical Field

The Intelligent Filing System enables the user to locate the needed file in an intelligent and speedy way by flashing a Light Emitting Diode (LED) or emitting a sound signal. It also displays on the Liquid Crystal Display (LCD) of a receiver (attached to the file) the number of the department requesting the file. The same idea could be implemented in a warehouse for requesting parts whereupon receiving the signal the shelf holding the requested item would signal by flashing the LED (or sounding a buzzer or lighting a lamp) indicating its location. In this situation the LCD would display two different numbers, the first number indicates the requesting department (invoice number), and the second number indicates the quantity requested of that item. All these operations are achieved on wireless basis in this system.

Background Art

Intelligent filing system is an archiving system in which a file could be located using wireless communication.

In spite of the advances in computer archiving (paper-less), microfilm, and microfiche technology, paper files remain an important media for storing legal documents, medical records, and original certificates. Archiving of these physical files remained a bottle neck in any department. This is due to the following difficulties:

1- Each file has to have a large label holding its number to be easily identified and it must be archived in an orderly manner to facilitate manual retrieval. This requires a specific numbering and archiving system and skilled personnel to handle it.

2- A returned file has to be placed in its previous location. This is a time consuming process and prone to mislocation.

3- Locating a misplaced file entails the search of the whole archive which is definitely impractical. Thus a mislocated file becomes a lost file.

4- The files' numbers requested are manually written on a sheet of paper in an unordered manner. This requires the person fetching the files to go back and forth looking for the files as listed and that is effort and time consuming.

5- The fetched files have to be organized in a specific way before sending them to the ordering departments which is also time consuming and error prone.

To alleviate such problems, we came up with the idea of the Intelligent Filing System where the requested file signals by an LED or a sound indicating its location (come and get me I am here). Moreover the receiver on the file has an LCD panel that displays the number of the department requesting that file.

5 **Disclosure of the Invention**

In this invention the term (unit) is suggested. A unit is defined as follows: any item that is given a filing number and usually stored in a specifically organized manner. A file in an archive is a unit, a book in a library, or an item in a warehouse is also a unit. In the latter case the kind of item is considered as a unit in the system and is given a specific
10 number. Thus, when ordering a quantity of any kind of item, the unit number specifically relevant to that kind is used.

The following steps provide a full description of the systems function:

A previously coded wireless receiver figure (5) is attached to each unit of the system. Thousands of units are usually stored in a central location (archive/ warehouse/
15 library). A stand-alone transmitter figure (1) with a unique identification code is placed in each ordering department. The code is specific to the department or location placing the order. Another version is a centralized transmitter figure (3) connected to the telephone line and optionally hooked to a computer in the computer network of the organization.

The stand-alone transmitter sends the id number of the unit (and also the quantity)
20 in addition to the code of the ordering department. The central system determines the ID number of the ordering department by a caller ID, or it prompts the ordering department via synthesized speech to identify its code.

The unit number and department codes are then transmitted wirelessly (5 and 10) or (17 and 23) in the form of radio waves or as a beam of invisible light. Among the
25 thousands of receivers in the archive, only the receiver attached to the requested unit responds to its code by emitting a light signal or beeping a buzzer (27). The LCD (25) on the receiver displays the number of the ordering department (and the quantity of ordered items). It is also possible for the receiver to send a signal to the transmitter confirming the receipt of the order.

The ordered units, i.e. those that received the signals and their LED's are flashing (31), are then collected by a person or a robot. He then reads the number on the LCD (25) of each file and sends it to the requesting department or clinic.

On returning the unit, after use, the numbers on the receiver's screen are cleared 5 by pressing the reset button (28). The returned units are then placed in the nearest place (without order). This allows with time, an idea of which units are most frequently requested as they will be in the front and those rarely ordered will be in the back.

In the case of store items, the person collects the ordered quantities of the units that have emitted signals and the numbers on the receiver's screen (25) are then cleared.

10 When new units e.g. (files) are added, the receiver is programmed (33) on an unused number and is attached to the unit that is placed on the first available shelf space without the need to program the transmitter of its number or place.

When a new ordering department is to be added, it is given a transmitter with a unique code (9 or 22) or its specific code is added to the central transmitter system.

15 When a receiver's battery (35) is about to expire, this is detected by the energy monitoring unit (36), which starts displaying special alarming signals such as the maintenance department number where it should be sent for replacement (or it sends the receiver's code to the central receiver in case of order confirmation option).

Optionally a large television could be screen connected to a central transmitter, 20 and the persons working in the archive / store can read the list of the received orders from any place in the store and make sure that all the ordered units are collected.

It is also possible, in the case of central transmitter (16), to request a printed statistical report of all the numbers previously ordered, the ordering departments and the time of order.

25 It is possible in all cases to reprogram the transmitter (6 or 19) or receiver (29) to change its specifications or to add new functions that suit the user's need (through connection with the external computer).

The advantages of this system is that it addresses all the difficulties of the current archiving system previously discussed. These advantages are:

30 1- There will not be any need to have a large label to hold the file number since manual searching for a file number has been replaced by searching for a flashing LED.

Moreover, the need to sort the files of the archive does not exist, since the files are wirelessly located by the flashing of the LED.

2- Since archives need not be in an orderly fashion, a returned file could be placed any where in the first available location.

5 3- With this system, no file could be mis-placed since the file could be located wirelessly.

4- Since the files are requested remotely, writing the requested files on a sheet of paper is eliminated. The person collecting the files goes in one direction collecting the signaled files and back again collecting newly signaled files and that is definitely more
10 efficient.

5- The LCD on each file clearly identifies the requesting department and this definitely speeds distribution.

In the following section we shall give the descriptions of the transmitters used and that of the receiver.

15 **Brief description of the figures**

Figure (1): General view of the transmitter unit of type one (local).

Figure (2): The internal design of the transmitter unit of type one.

Figure (3): Transmitter unit of type two (central).

Figure (4): The internal design of the transmitter unit of type two.

20 Figure (5): The receiver unit.

Figure (6): The internal design of the receiver unit.

There are two types of transmitters: type one; Stand-alone, of which one unit is placed in every location where requested files are needed. It is shown in figure 1 whose components are:

25 (1) A display screen of the LCD type to display numbers and messages.

(2) A key-pad (similar to the one on the telephone line), for entering the number of files (and quantities of items).

(3) A Request button, to transmit the request wirelessly.

(4) A Cancel button, to void the request and start again.

30 (5) A Radio Frequency (RF) antenna or an Infra Red (IR) emitter.

(6) A plug for connecting an external computer to re-program codes and functions of the transmitter.

The internal components of the stand-alone transmitter is shown in figure 2 as :

(7) A microcontroller for communication with the external world (display, key-pad, buttons, and external computer). It decodes input signals, prepares output signals, and generates the codes to be transmitted wirelessly.

(8) A read-only-memory (ROM), that contains the control program of the micro-controller.

(9) An electrically erasable programmable read only memory (EEPROM) for storing semi-temporary data like the id number of the transmitter (that can be changed as per the user's requirement).

(10) A wireless transmitting unit, that receives the generated code from the micro-controller in the form of serial binary data (bits) and transmits them as radio frequency waves of a certain frequency, or pulses of an invisible beam of light (infrared for example).

The second type of transmitters is a "central" equipment that connects to the telephone exchange. Here the files are requested by calling that telephone extension, and pressing the individual numbers on the telephone key-pad as in the case of normal pagers. It is shown in figure 3 whose details are:

(11) Telephone plug, to connect to a telephone line.

(12) A multi-line display of the LCD type to show the id number of the requesting department, the requested item number, and other explanatory messages. It may be connected to a large TV screen showing all the numbers requested (legible from a distance) similar to airport displays.

(13) A key-pad similar to the telephone key-pad.

(14) A Request button, to transmit the request wirelessly.

(15) A Cancel button, to avoid the request and start again.

(16) A Report button to obtain a daily/weekly report of numbers requested, the requested departments, and times of requests.

(17) An RF antenna or an IR emitter.

(18) A Printer port (for printing reports).

(19) A plug for connecting an external computer for reprogramming codes and functions of the transmitter.

The internal components of the transmitter of the second type is shown in figure 4 as:

5 (20) A micro-controller for communication with the external world (display, key-pad, buttons, printer, and external computer). It decodes input signals, prepares output signals, and generated the codes to be transmitted wirelessly.

(21) A read-only-memory (ROM), that contains the control program of the micro-controller.

10 (22) An electrically erasable programmable read only memory (EEPROM) for storing semi-temporary data like the id number of the transmitter (that can be changed as per the user's requirement).

(23) A wireless transmitting unit, that receives the generated code from the micro-controller in the form of serial binary data (bits) and transmits them as radio frequency waves of a certain frequency with enough power to cover the required range, or pulses of an invisible beam of light (infrared for example).

15 (24) A Telephone interface unit, whose function is to answer the telephone call, generate appropriate voice prompts, decode the Dual Tone Multi Frequency (DTMF) signals representing the number of item and the quantity, and deliver the numbers to the micro-controller.

20 The central type of transmitter may be a plug-in board for a personal computer, which is part of the organization's network, and hence there is a link between the archiving system and the organization's databases. In this case, the files is requested directly from the computer terminals. Similarly, an item could be requested from the warehouse using remote computer terminal. This would definatly facilitate home shopping via the internet.

The receiver is shown in figure 5 with dimensions approaching the size of the wrist watch (so that it could be glued to the file spine). Its components are:

(25) A 4-6 digit display to show the requesting department, (and the quantity of items).

(26) A solar cell for converting the ambient light in the archive room into electrical energy to be stored in the rechargeable battery (in order to reduce the battery replacement process).

5 (27) A bright light emitting diode that flashes when that receiver is addressed (or a small speaker that beeps).

(28) A Reset button, that is recessed so that it has to be pressed intentionally (to erase the numbers from the display).

(29) A plug for connecting an external computer for reprogramming codes and functions of the receiver.

10 The internal components of the receiver are shown in figure 6 as:

(30) A wireless receiving unit, which is (in case of RF) an embedded antenna, and a tuned circuit for the transmitter's frequency. It receives the radio waves, demodulates them, and delivers the received codes as binary bits to the micro-controller. In case of light beam transmission, it is a photo-cell sensitive to the frequency of the transmitted beam, and the
15 accompanying electronics.

(31) A micro-controller which decodes the received bits, compares them with the built-in code of the receiver, and then communicates with the display, flashing LED, and the external computer.

(32) A read-only-memory (ROM), that contains the control program of the micro-
20 controller.

(33) An electrically erasable programmable read only memory (EEPROM) for storing semi-temporary data like the id number of the receiver (that can be changed as per the user's requirement).

(34) A coding circuit, to give the receiver a unique code (one out of several
25 thousands/millions depending on the number of bits used).

(35) A power supply unit for supplying the electrical energy to the receiver from the internal battery, and is also responsible for regulating battery charging from electrical energy generated from the solar cell.

(36) A power monitoring unit that inform the micro-controller of the near-end charge of
30 internal battery so that the user is notified appropriately to change the battery.

CLAIMS

The Inventors claim the protection of the followings:

- 1- Protection of the method of application of wireless communication for locating a specific file in an archive.
- 2- Protection of the different parts of the devices applying the method of locating a specific file in an archive, as shown in figures 1 to 6. This method of application applies also to find specific book (or audiovisual tape or disk) in a book store or a library (audiovisual or mainframe tape library) without using the method of numbering the items and putting them in order. The requested items signals its location by flashing an LED upon receipt of its request, and it identifies the requesting entity number on an LCD being a clinic, a department, or a client. This is **characterized by** having a wireless receiver (RF/IR) on every file and a transmitter unit in every department or a central transmitter in the archive room.
- 3- Protection of the method of application of wireless communication to locate a wanted part in an unordered warehouse.
- 4- Protection of the devices doing the application of wireless communication to locate a wanted part in an unordered warehouse as shown in Figures 1 to 6. Here the shelf holding the requested part signals that the item being requested and an LCD shows the number of units requested and the ordering department or client.
Characterized by having a wireless receiver (RF/IR) on every shelf with large LCD panel, and the central transmitter in the warehouses, or individual transmitter at the point of sale (POS) or connected to the POS..

AMENDED CLAIMS

[received by the International Bureau on 25 June 1998 (25.06.98);
original claims 1-4 replaced by amended claims 1-12 (2 pages)]

1. An intelligent filing system comprising of a central transceiver placed in the archive room. The transceiver includes the following capabilities:
 - 5 a. Sending and receiving messages to and from every file in the archive room.
 - b. Sending and receiving information to and from the archive room computer.
 - c. Communicate via the telephone line with the stand-alone units.
 - d. Having a caller ID feature.
 - 10 e. Voice synthesizer to report messages verbally through a speaker or through the telephone line.
2. The intelligent filing system as defined in claim "1" further includes several stand-alone units to be placed in every room in the establishment where the file may be taken to. Each of these units has a touch-sensitive LCD screen for entry of file number and message display.
- 15 3. The stand-alone units as defined in claim "2" has the means of two-way communication with every file in the same room.
4. Each of the stand-alone units as defined in claim "2" has the capability of communicating with the central transceiver as defined in claim "1" via the telephone line.
- 20 5. Every file in the intelligent filing system has the means of displaying messages characterized by having a highly reflective colored LCD display with all its driver electronics on every file.
6. The driver electronics as in claim "5" has the capability of displaying a moving bar character on the LCD display with different colors so as to attract the attention of the person within its vicinity and to indicate the importance or type of message.
- 25 7. The LCD display as in claim "5" would show messages sent by central transceiver in claim "1" or relayed by the stand - alone unit in claim "2".

8. The driver electronics in claim "5" would show pre-stored messages on the LCD screen at preset time intervals.
9. Every file in the intelligent filing system includes two-way communication capabilities with either the central transceiver as in claim "1" or the stand alone unit as in claim "2".
10. The intelligent filing system facilitates instant file fetching characterized by having a moving red bar displayed on its LCD along with a message indicating where the file should be delivered.
11. The intelligent filing system facilitates instant file resshelf, characterized by having the file next to its original location on the shelf display a moving green bar on its LCD and both files will also display the same number on their respective LCD.
12. The intelligent filing system facilitates file follow-up on or off the shelf and, in or outside the archive room, characterized by having the properties given in claims 3,4,10 and 11. In addition to the capability of the central transceiver to communicate with humans via synthesized voice as in claim "1".

AMENDED SHEET (ARTICLE 19)

STATEMENT UNDER ARTICLE 19

The intelligent filing system is comprised of a central transceiver in the archive room, and stand-alone units (transceivers) in every room in the establishment where files may be delivered. Every file is equipped with a highly reflective colored LCD screen with its driver electronics and two-way communication electronics. With this system, a person in any room of the establishment would enter the requested number for file "x" through a touch-sensitive LCD screen on the stand-alone unit. The stand-alone unit would relay the requested number to the central transceiver via the telephone line. The central transceiver having a caller ID feature would relay the requesting department name and room number to the receiver of file "x." This information along with a moving red bar would appear on the LCD of file "x."

Once the file "x" is in the requesting room and after a preset time, it will signal to the stand-alone unit "a" that it is available. Unit "a" would then relay to the central transceiver that file "x" has been delivered.

If another department using stand-alone unit "b" requests the same file "x," the central transceiver would notify unit "b" of the room number of file "x." Moreover, the central transceiver initiates a request to unit "a" where file "x" is located and unit "a" would relay the information of the newly requesting room number to file "x." These data along with a moving red bar are displayed on the LCD of file "x." The central transceiver would then dial the telephone connected to unit "a." The person answering the phone would be instructed via the synthesized voice of the central transceiver to have the file with the moving red bar (file "x") ready for pickup or delivers it to the room displayed on its LCD.

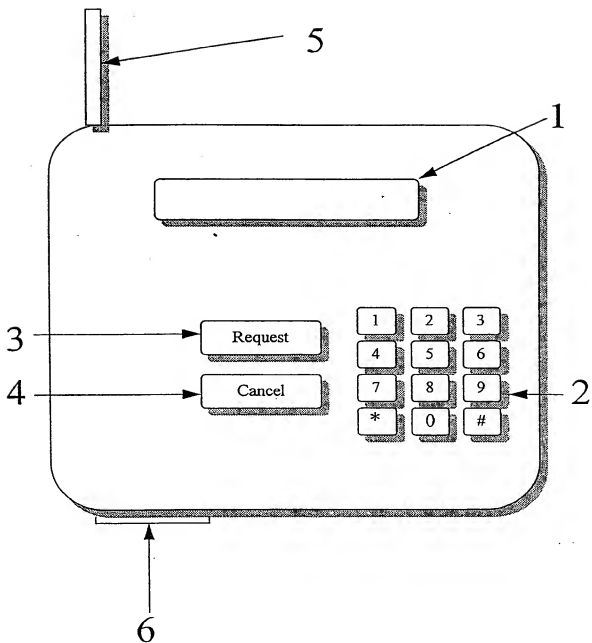
When file "x" is to be returned to its location in the archive room, the central transceiver sends a number to be displayed on the LCD of file "x." That same number will also be displayed on the LCD of a file "y" located next to the original location of file "x" on the shelf. A moving green colored bar will be displayed on the LCD of file "y." The person trying to resshelf file "x" would then look for a file having a moving green bar and displaying the same number as that displayed on the LCD on file "x."

35 With the preceding feature, the files in the archive could keep their shelving order, so in case there is a system shut down, manual fetching or returning files could be done in the traditional way, avoiding the chaos of fetching files in a randomly ordered archive.

40 With this system, we shall not need an LED or a beeper on every file; this will affect figure 5. Furthermore, the stand-alone units will have telephone line connectivity with the central transceiver. Files would have two way communications rather than being optional as discussed in page 2, line 28.

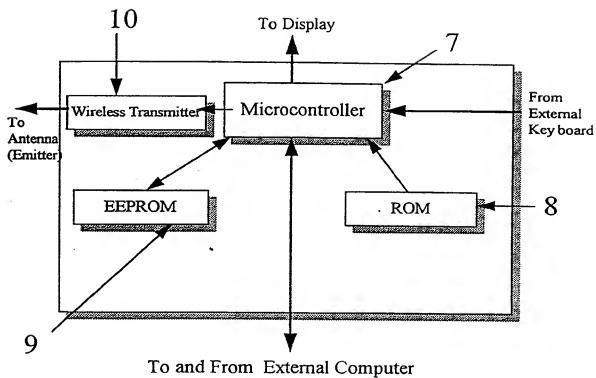
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FIG. 1



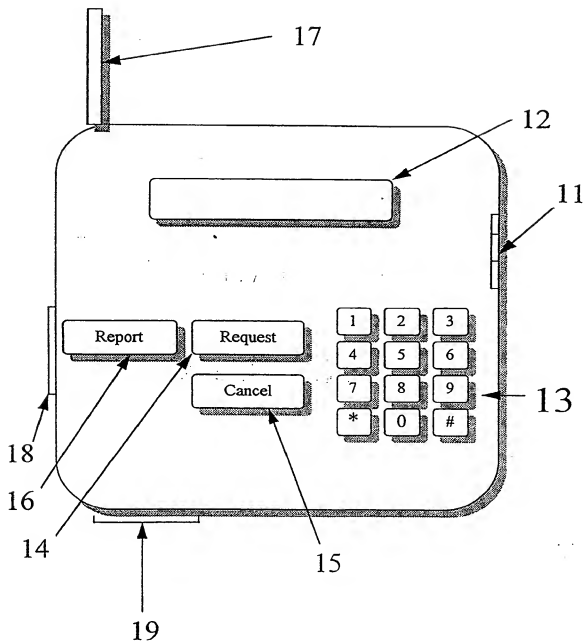
2/6

FIG. 2



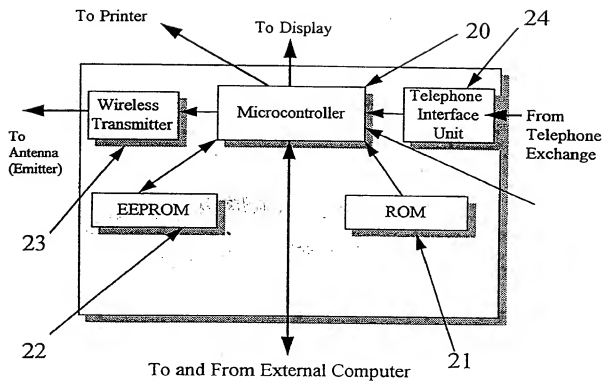
3/6

FIG. 3



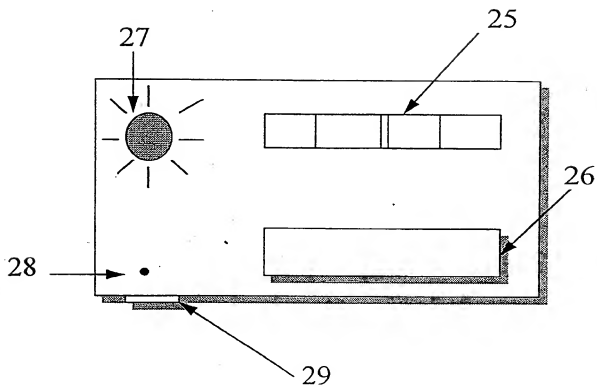
4/6

FIG. 4



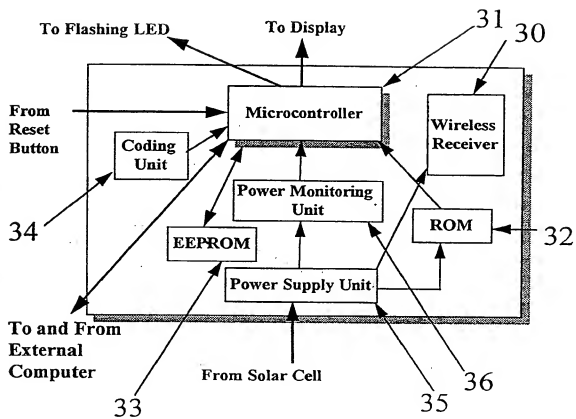
5/6

FIG. 5



6/6

FIG. 6



INTERNATIONAL SEARCH REPORT

International Application No.

PCT/IB 97/01031

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 G06K19/07 B65G1/137

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G06K B65G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category ¹	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 203 687 A (SEKISUI JUSHI KK) 3 December 1986 see abstract; figures 1, 3, 5, 7, 9, 13 see page 6, line 20 - page 7, line 20 see page 9, line 10 - line 20 see page 13, line 11 - page 14, line 29 ---	1-4
X	FR 2 667 183 A (TREILLET JACQUES) 27 March 1992 see the whole document ---	1, 2
X	FR 2 592 012 A (VIDAL GILBERT) 26 June 1987 see the whole document ---	1, 2
-/-		

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the international search

26 March 1998

Date of mailing of the international search report

29. 04. 98

Name and mailing address of the ISA

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Gysen, L

INTERNATIONAL SEARCH REPORT

Int: 'onal Application No
PCT/IB 97/01031

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category ¹	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>PATENT ABSTRACTS OF JAPAN vol. 096, no. 011, 29 November 1996 & JP 08 175632 A (OKAMURA CORP), 9 July 1996, see abstract</p> <p>-----</p>	1-4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 97/01031

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 2,4 (both partly)
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

Claims 2 and 4 partly rely on references to the drawings (Rule 6.2(a)).

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 97/01031

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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